



Prioritize NextGen Programs for Implementation
NAC Task 22-1 Report

To be presented to the NextGen Advisory Committee
April 29, 2022

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Executive Summary

During the March 28, 2022 NAC meeting, attendees were informed of a significant budget shortfall impacting FAA modernization programs. The FAA stated the wish to resume deployment and training in a way that provides optimal benefits to the aviation industry as a whole. The FAA tasked the NAC with providing advice on key priorities before the end of April 2022.

The tasking included six key NextGen programs – Initial En Route Data Comm, Full En Route Data Comm, TFDm, TBFm, ADS-B In CAS and ADS-B In IM. Despite concerns with the scope, timing and utilization of the results, the NAC SC completed a subjective assessment of the six programs/sub-programs. This assessment provides consensus feedback on operational benefits and readiness expectations.

Modernization of the NAS through efforts like NextGen has depended on the partnership of FAA and industry investment. Despite the challenges of the COVID 19 pandemic, industry has continued to make investments in NextGen equipage, information technology, and operational planning capabilities, based on understood FAA deployment plans and ROI expectations tied to these plans. Delivery delays and re-scoping capabilities of FAA plans could erode industry's confidence and may lead to future investment reluctance in efforts such as the MCL. While industry does not know how the FAA will use the feedback in this report, there is hope that it will aid in the FAA's restart of key programs to meet the needs of a modernized NAS that enhances safety, efficiency, capacity, and schedule reliability; and that reduces environmental impacts.

Background

During the March 28, 2022 NextGen Advisory Committee (NAC) meeting, then Federal Aviation Administration (FAA) Administrator Steve Dickson and Acting Air Traffic Organization (ATO) Chief Operating Officer Tim Arel informed the meeting attendees of a significant budget shortfall impacting FAA modernization programs. Mr. Arel explained that the FAA had absorbed almost \$300M in additional costs in delaying the implementation of several key programs due to the Coronavirus (COVID) 19 global pandemic. The budget dilemma would impact the restart of NextGen implementation, requiring re-sequencing timelines and scope adjustments. Mr. Arel stated that in the face of the realignment of resources, the FAA wished to resume deployment and training in a way that provides optimal benefits to the aviation industry as a whole.

A week after the NAC meeting, FAA Deputy Administrator Brad Mims tasked the NAC with providing advice to the FAA on key NAC priorities before the end of April 2022 (see Appendix A for full tasking letter). To address the tasking in the unprecedented short time period dictated by the FAA, the NAC Chairperson, Mr. Chip Childs, notified NAC members that the NAC Subcommittee (NAC SC) Chairperson, Mr. John Ladner, would convene the NAC SC to meet with FAA subject matter experts (SMEs) and start deliberations in early April.

This report documents the efforts of the NAC SC under the April 2022 tasking and presents the group's findings and conclusions.

Methodology Overview

The NAC SC applied a multi-step approach to address the tasking request:

1. Meet with FAA SMEs to review the tasking, consider the scope of the request, and receive further information on the programs of interest.
2. Conduct an assessment of each program's expected level and likelihood of benefit, using methodology similar to that used in recent past NAC prioritization efforts.
3. Formulate and document findings and conclusions, including any concerns with the request, process and subsequent results.

The NAC SC currently has well over 100 non-FAA participants. Contributions to the tasking were balanced between NAC SC participants who represent NAC members directly and others who are aviation industry stakeholders. This was done to produce responses within the short tasking time period but also meet the FAA's expectation for responses that reflect a broad industry view. The full NAC SC non-FAA roster was invited to participate in the information, deliberative and documentation meetings. Inputs to the benefits scoring assessment were limited to NAC organizations, with limited exception explained in the "Scoring Assessment and Results" section below.

With the budgetary nature of the requested input and to ensure no undue influence in accordance to the Federal Advisory Committee Act (FACA), the FAA did not participate in any of the NAC SC deliberative sessions. FAA SMEs from the Air Traffic Organization were available to the NAC SC to answer clarifying questions and provide additional programmatic information.

Initial Informational Meeting and Scope Modification

The NAC SC met with FAA leadership and SMEs approximately one week after the March 2022 NAC meeting. During the meeting, the FAA presenters provided rationale for the tasking scope and timing, including the following:

- The FAA chose the NAC for this advice as it provides the widest cross section of aviation industry and has more than a decade of success in prioritizing NextGen initiatives.
- The short timeframe for the request was driven by the FAA’s need for input before the 2024 budget request is finalized.
- Over the last few years, the FAA has been making tactical budget adjustments at the program level, however these have not been enough. There is a need to realign resources across the entire modernization portfolio, which is about 14% of the FAA budget (86% of the FAA budget is dedicated to safe and efficient operation of National Airspace System (NAS)).
- While the FAA tasking letter identified five programs of interest – Terminal Flight Data Manager (TFDM), Time Based Flow Management (TBFM), En Route Data Communications Initial Services, En Route Data Communications Full Services, and Automatic Dependent Surveillance Broadcast In (ADS-B In) – the FAA SMEs chose to expand the scope to six programs/sub-programs by breaking ADS-B In into two capabilities: Cockpit Display of Traffic Information (CDTI) Assisted Separation (CAS) and Interval Management (IM).
- The programs identified in the tasking scope fall within the 14% of the budget for modernization. They also represent programs with remaining NextGen Joint Implementation Plan (NJIP)¹ commitments and with recent NAC recommendations.²
- The timeframe of interest should be near-term, focusing on capabilities and services that could deliver benefits by 2025.

While the FAA expanded the tasking scope to separate ADS-B In CAS and ADS-B In IM capabilities, further breakdown of the other larger programs (i.e., TFDM or TBFM) to reflect sub-programmatic functions or site-specific functions was not requested. The FAA’s rationale for that decision was that there was not adequate time to accomplish site-specific prioritization.

Scoring Assessment and Results

Process Overview: A scoring process similar to that used for the recent PBN Clarification³ and the Section 547⁴ tasks was employed as a foundation for this tasking. This has proven to be a

¹ “NextGen Advisory Committee NextGen Priorities Joint Implementation Plan, CY2019–2022,” June 2021.

² “ADS-B In Commercial Application Technologies Ad Hoc Team NAC Task 20-1 Final Report,” June 2021.

³ “Performance Based Navigation (PBN) Clarification Ad Hoc Team NAC Task 19-4 Report.” November 2020.

⁴ “FAA Reauthorization Act of 2018, Section 547 Enhanced Air Traffic Services NAC Task 20-3 Report,” March 2021.

successful method for industry to derive consensus. The NAC SC participants representing the thirty NAC member organizations were asked to provide a set of assessments concerning the benefits of each of the six programs/sub-programs. The set of scores included two assessments:

- Benefits Readiness – the likelihood that the capability can be implemented and deliver benefits by 2025, including level of operator equipage required and achieved, availability of interdependencies, and other challenges.
- Benefits Magnitude – the expected level of benefit, whether that benefit is localized or has national impact, and how that benefit aligns with operational priorities (safety, efficiency, capacity, etc.)

A subjective scale of 1 to 5 was used for each score, where 1 represented the lowest expected benefit or readiness, and 5 represented the highest.

The respondents were asked to provide one set of scores per NAC organization. These were then averaged across the respondents to produce an aggregate score. While primary input was derived from NAC SC participants who directly support NAC members, two NAC SC participants (Airlines for America (A4A) and Regional Airlines Association (RAA)) were asked to solicit their membership for broader operator input from those organization not represented on the NAC.

While the FAA did not want the TBFM and TFDM programs broken into smaller components, many of the NAC SC operator representatives felt that there were important distinctions in each of these initiatives. Therefore, in addition to an overall set of scores for TBFM, separate scores were requested for Terminal Sequencing and Spacing (TSAS) in Northwest Mountain and for TBFM in Northeast Corridor (as described under the scope for TBFM in FAA read-ahead materials). Similarly, in addition to an overall set of scores for TFDM, separate scores were requested for 2023-2025 A site implementations (which include surface metering capabilities) and for 2023-2025 B site implementations (which does not include surface metering capabilities).

The FAA SMEs and their support consultants provided materials to support the scoring process. These materials included:

- Read-ahead presentation for the April 6, 2022 NAC SC meeting which included an overview of the capabilities, projected benefits, current NAC commitments/milestones, and other related information (e.g., capital investment milestones).
- FAA benefits calculation and other information from the ADS-B In Benefits Case (previously presented to the Northeast Corridor NextGen Integration Work Group and the ADS-B In Capabilities Ad Hoc Work Group).
- The draft post-COVID TFDM deployment waterfall (previously presented to the Surface and Data Sharing NextGen Integration Work Group).
- Slides describing TSAS and Time Based Metering (TBM) benefit mechanisms and opportunities.

- Data Communications deployment schedule, showing waterfall for Controller-Pilot Data Link Communications (CPDLC) Departure Clearance, Initial En Route Services, Full En Route Services, and candidate enhanced services.

Caveats: Before presenting the results of the scoring assessment, there are several caveats that must be shared:

- First, the NAC organizations were given a short amount of deliberative time (approximately two working days). This was driven by the overall timing of the tasking. More time would have allowed for more in depth discussions and perhaps more refined scoring.
- Second, there were varying levels of awareness around program status and benefits amongst the respondents. Related to the previous caveat, more deliberative time would have allowed for more expansive discussions for each NAC organization and in the larger NAC SC group, and ultimately level-setting of the overall understanding of each program/sub-program.
- And finally, while the FAA provided some information about the six programs/sub-programs, they did not provide any cost/financial information. Some respondents had access to limited budget data available through the FAA's 2023 budget⁵ estimates that are publically available. Many respondents felt that the cost/budget information was a necessary component of formulating an accurate benefit readiness score; in particular, the magnitude of resources needed to provide benefits by 2025. Respondents asked the FAA for materials that could inform an understanding of the relative costs between the programs in several ways, but the FAA declined to provide this information stating that they did not believe it was needed to complete the tasking.

Scoring Results: Of the thirty organizations that make up the NAC, approximately two-thirds provided input to the scoring assessment. In addition to the operators represented on the NAC, A4A provided input from two additional air carriers and RAA provided input from four additional regional airlines. A full list of contributors is included in Appendix B. As noted under the caveats, there were varying levels of benefits and readiness awareness amongst the respondents, and in some cases, partial input was provided. Some contributors also limited their inputs to readiness scoring, feeling that assessment of operational benefits should be left to the operator respondents. These circumstances were accounted for in the development of the average scores.

Figure 1 shows the scoring results for all respondents. This includes operators and equipment manufacturers. Because the FAA emphasized the need to understand which programs/sub-programs are expected to be the most operationally beneficial, the operator scoring was also considered separately. Figure 2 shows the scoring results for only the operator respondents⁶. In

⁵ https://www.transportation.gov/sites/dot.gov/files/2022-03/FAA_Budget_Estimates_FY23.pdf

⁶ The operator respondents are identified as air carriers, regional airlines, business aviation, and associations representing controllers and pilots.

Figure 2, the scoring responses for operators that are represented on the NAC is distinguished from the scoring from non-NAC operators.

From both figures, the scoring around the expected magnitude of benefits is relatively close. These capabilities are all expected to provide moderate to high benefits. There is a wider spread in the expected level of readiness, which tracks with the known equipage levels (for Data Comm and ADS-B In) for the various operators. This is more noticeable when the broader operator inputs are included.

Comparing Figure 1 and Figure 2, it is fairly clear that the response of the full set of respondents is aligned with the operator responses.

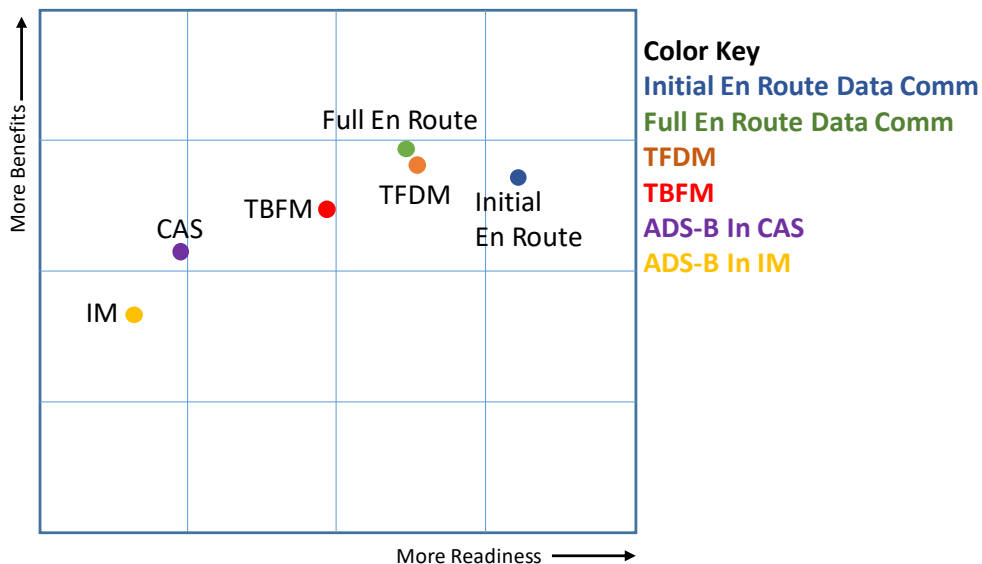


Figure 1. Scoring Results for All Respondents

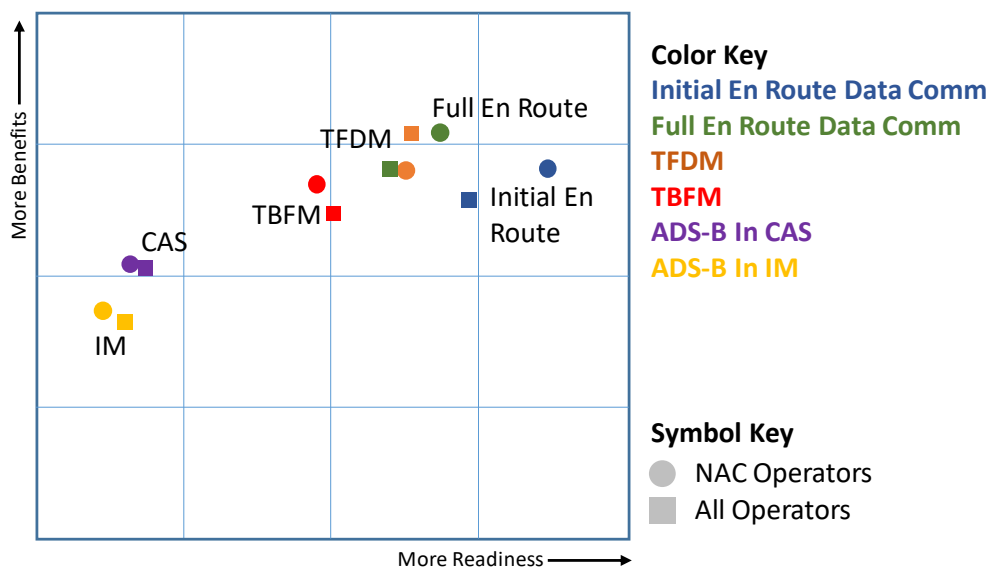


Figure 2. Scoring Results for Operator Respondents

Figure 3 shows the scoring results for the further breakdown of the TFDM and TBFM programs. Even though there was an expectation that the TSAS and TBFM would score differently, the actual responses do not present a significant difference in either benefits or readiness scores. For the TFDM breakdown, the difference in expected benefits associated with surface metering is the main reason for the variability in the expected magnitude of benefits.

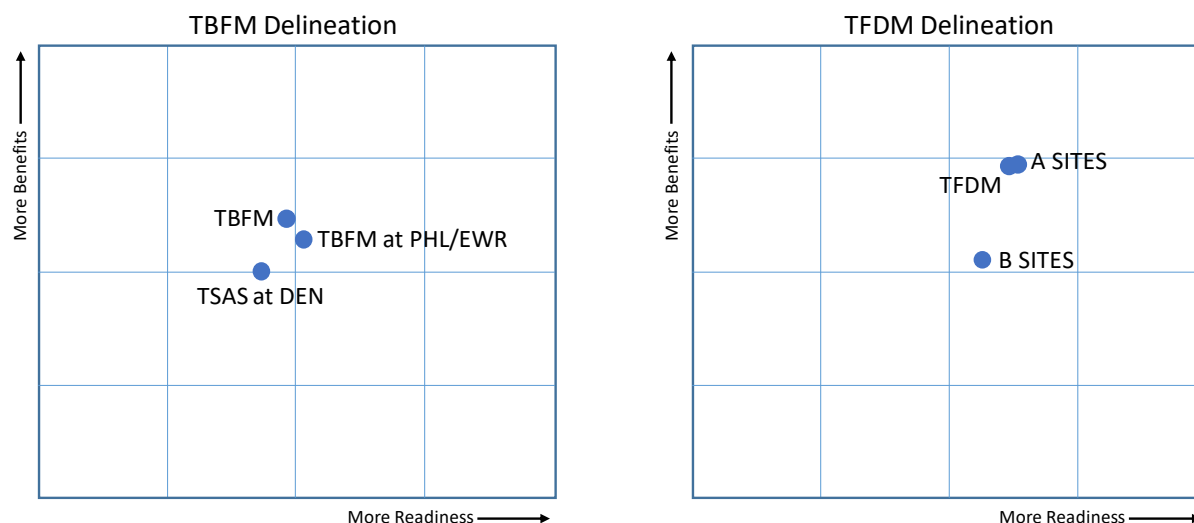


Figure 3. Scoring Results for TBFM and TFDM Sub-Elements

Conclusions and Recommendations

The last two years of the COVID 19 pandemic has severely impacted the modernization of the NAS. NextGen implementations were essentially suspended due to restricted access to FAA ATC facilities in the effort to reduce infection and ensure the operation of the NAS. The understanding of the NAC was that the deployment schedules would be extended, but given FAA fiscal management, it is now apparent that budget and scope are also impacted. For its part, despite the cataclysmic reduction in revenue streams resulting in austerity and right-sizing, industry has continued to make investments in NextGen, based on understood FAA deployment plans and expected return on investment (ROI) associated with these plans. These investments include but are not limited to aircraft equipage, information technology, and operational planning capabilities. These significant investments total in the hundreds of millions of dollars.

This tasking involves six key NextGen programs and capabilities that are critically important to the NAC and industry. These programs and capabilities – Initial En Route Data Comm, Full En Route Data Comm, TFDM, TBFM, ADS-B In CAS and ADS-B In IM – have been supported by the NAC from inception to their current level of maturity. Industry continues to support them to full implementation so that their many benefits can finally be realized, including enhancements in safety, efficiency, throughput, and/or capacity. These benefits are essential to continued health of the aviation system and are also necessary steps toward the goals of environmental sustainability.

The NAC understands the importance of the request for industry input on priorities in light of the FAA's budget deficit. However, concerns about the tasking scope and timing constrained the ability to respond beyond the scoring results. The primary concerns include:

- The scope only covered the six programs/capabilities. There are many other FAA modernization programs that were not included, even though it appears that a budget deficit of this size would go beyond these six identified programs.
- The potential trade-offs with other programs or capabilities were not presented or discussed with the NAC SC. Similarly, there was not enough time to explore the potential impacts caused by interdependencies with other sustainment or modernization programs. These interdependencies include other industry-priority programs such as Performance Based Navigation (PBN), Multiple Airport Route Separation (MARS), TBO (Trajectory Based Operations), Flow Management Data Services (FMDS), and Space-Based ADS-B.
- Operational benefits are site-specific and capability-specific. Additional information around those details would have allowed for more comprehensive assessment.
- It is not clear how the FAA will use the feedback or response to this tasking. The information included in this response should not be interpreted as endorsement of schedule extension or scope reduction for any of these efforts.
- While the FAA provided some information on existing NJIP commitments, there are larger ramifications to many of the NAC's recent recommendations. These include but are not limited to the Data Comm Avionics, Minimum Capabilities List (MCL), FAA Reauthorization Section 547 – Enhanced Traffic Services, and ADS-B In Commercial Application Technologies.

In general, while the results above are provided as feedback on the operational benefits expectations, without a fuller picture of the decision space – other programs, trade-offs in consideration, etc. – this feedback is not a ranked list. If the FAA wishes to pursue more thorough prioritization input, industry is very willing to participate in a more comprehensive evaluation through the NAC, with adequate time and supporting information, as was completed during other budget challenges in 2013 and 2017.

Modernization of the NAS through efforts like NextGen has depended on the partnership of FAA and industry investment. Seeing timely ROI for industry is crucial in encouraging future participation in important endeavors such as the MCL. Delivery delays and re-scoping capabilities in FAA modernization programs could erode industry's confidence and may lead to future investment reluctance. While the NAC and industry do not know how the FAA will use the feedback in this report, there is hope that it will aid in the FAA's restart of key programs to meet the needs of a modernized NAS that enhances safety, efficiency, capacity, and schedule reliability; and that reduces environmental impacts.

Appendix A: FAA Tasking Letter



U.S. Department
of Transportation
**Federal Aviation
Administration**

Office of the Deputy Administrator

800 Independence Ave., S.W.
Washington, DC 20591

April 4, 2022

Mr. Russell "Chip" Childs
President and Chief Executive Officer
SkyWest, Inc.
444 South River Road
St. George, UT 84790

Dear Mr. Childs:

The Federal Aviation Administration (FAA) is requesting that the NextGen Advisory Committee (NAC) provide advice on key NAC priorities to inform the FAA's planning as we move forward in making challenging decisions to sustain and evolve the National Airspace System (NAS). This consensus-based advice from the NAC will help us reassess our near-term priorities coming out of the COVID-19 pandemic and ensure we have the right balance between sustaining NAS operations and continued investments in operationalizing NextGen.

Task 22-1: Prioritize NextGen Programs for Implementation

The NAC is tasked to provide the FAA a consensus prioritized list of the following future implementation NextGen programs:

- Terminal Flight Data Manager (TFDM)
- Time-Based Flow Management (TBFM)
- En Route Data Communications Initial Services
- En Route Data Communications Full Services
- ADS-B In

The goal of this task is to produce a consensus prioritized list of NAC priority programs and is not intended to accelerate any of the current NAC priorities. The prioritization should focus on the near-term (e.g., now through 2025). The report shall include the assumptions and data informing the consensus recommendation.

Scope

- FAA will provide Subject Matter Expert support
- Complete work and provide Prioritization Report no later than April 27, 2022

If you have questions, please contact Kimberly Noonan, NextGen Stakeholder Collaboration Division Manager at kimberly.noonan@faa.gov.

Sincerely,

A. Bradley Mims
Deputy Administrator

Appendix B: Contributors from NextGen Advisory Committee Subcommittee and Other Supporting Organizations

Air Line Pilots Association (ALPA)
Air Wisconsin
Airbus
Airlines for America (A4A)
Airports Council International - North America (ACI-NA)
Alaska Airlines
American Airlines
Atlas Air
Boeing
CommutAir
Delta Air Lines
Department of Defense (DoD)
FedEx Express
General Aviation Manufacturers Association (GAMA)
Hawaiian Airlines
Honeywell
JetBlue Airways
L3Harris Technologies
National Air Traffic Controllers Association (NATCA)
National Business Aviation Association (NBAA)
Piedmont Airlines
Port Authority of New York and New Jersey (PANYNJ)
Professional Aviation Safety Specialists (PASS)
Raytheon
Regional Airline Association (RAA)
Republic Airways
SkyWest Airlines
Southwest Airlines
United Airlines

Appendix C: Acronyms

ADS-B	Automatic Dependent Surveillance Broadcast
ATO	Air Traffic Organization
CAS	CDTI Assisted Separation
CDTI	Cockpit Display of Traffic Information
COVID	Coronavirus
CPDLC	Controller Pilot Data Link Communications
Data Comm	Data Communications
DCL	Departure Clearance
FAA	Federal Aviation Administration
FACA	Federal Advisory Committee Act
IM	Interval Management
MARS	Multiple Airport Route Separation
MCL	Minimum Capabilities List
NAC	NextGen Advisory Committee
NAC SC	NextGen Advisory Committee Subcommittee
NAS	National Airspace System
NextGen	Next Generation Air Transportation System
NJIP	NextGen Joint Implementation Plan
PBN	Performance Based Navigation
ROI	Return on Investment
SME	Subject Matter Expert
TBFM	Time Based Flow Management
TBO	Trajectory Based Operations
TBM	Time Based Metering
TFDM	Terminal Flight Data Manager
TSAS	Terminal Sequencing and Spacing